

Pollution Prevention (P2)

Avoid Waste – Add Value



Pollution Prevention

- ❖ “Any practice which reduces the amount of hazardous substance or pollutant entering a waste stream or being released to the environment.”
- ❖ Practices include:
 - Source Reduction (highest P2 value)
(don't create it in the first place)
 - Recycling
 - Reuse
 - Treatment (lowest P2 value)



Pollution Prevention Planning (P3)

www.ecy.wa.gov/programs/hwtr/P2/p3.html

❖ Required of business that:

- Generate $\geq 2,640$ pounds recurrent dangerous waste per year,
- For two years in a row; or
- Report a release under the Toxics Release Inventory law

❖ Free planning help available from Regional P2 staff



Will P2 Save You Money?



❖ You pay for waste four times:

- Buy the material
- Dispose of the material
- Buy extra material to replace what is wasted
- Meet safety and management regulations

❖ The next slides show typical actions that illustrate the hierarchy of pollution prevention. What level of pollution prevention do you think they show?

**Source
Reduction**

Reuse

Recycle

**Treatment/
Disposal**

**Wash Parts,
Collect and Evaporate
Contaminated Rinse Water**



**Source
Reduction**

Reuse

Recycle

**Treatment/
Disposal**

Distill Spent Solvent



- Onsite distillation uses evaporation and condensation to physically treat the chemical so that it can be reused.
- Decanting, letting the solids settle and pouring off the liquid solvent, is considered reuse, as there is no physical or chemical treatment.

Source Reduction

Switch to Non-Hazardous Solvents and Cleaning Solutions

Reuse

Recycle

Treatment/
Disposal



Glysol
Soy Cleaner

Super Blue
Surfactant Cleaner

Source Reduction

Extend the Life of Working Fluids In Metal Finishing

Reuse

Recycle

**Treatment/
Disposal**

- **Drip curtains**
- **Catch pans**
- **Part rack & basket design**



More Benefits of P2

- ❖ Reduced liability
- ❖ Improved competitiveness
- ❖ Improved safety and working conditions
- ❖ Reduced regulatory “exposure”



Financial Analysis Resources

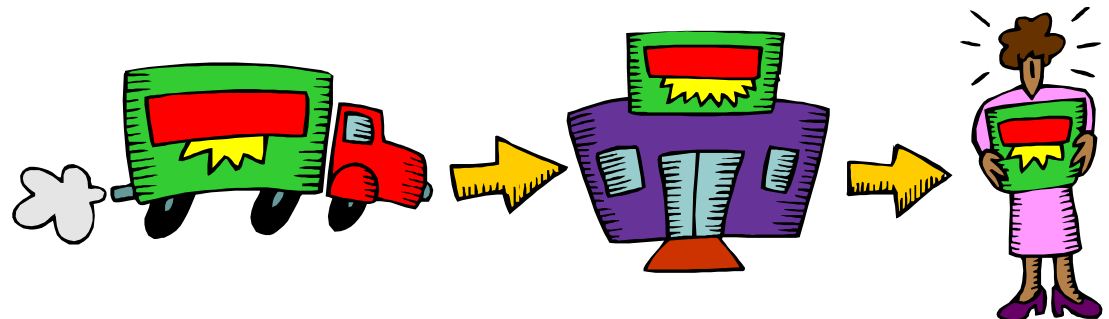
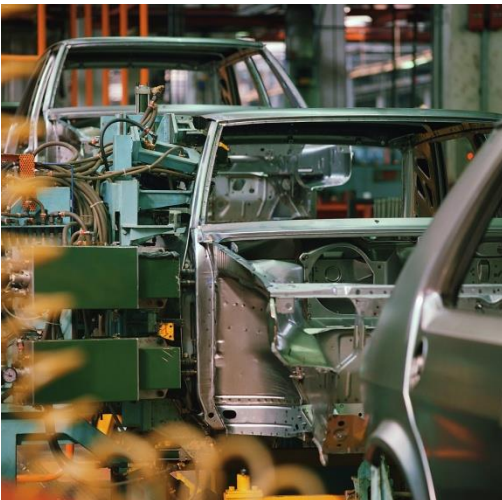
- ❖ ***Cost Analysis For Pollution Prevention***
 - <http://www.ecy.wa.gov/biblio/95400.html>
 - Regional Office P2 Technical Assistance

Lean Manufacturing and the Environment

Another route to P2 is “Lean Manufacturing”

❖ Lean Manufacturing is:

- A systematic approach to identify and eliminate waste (non-value added activities)
- Continuous improvement
- Production at the “pull” of the customer



The Seven Deadly Wastes

(aka Non-Value Added activities)

- ❖ Overproduction
- ❖ Inventory
- ❖ Transportation
- ❖ Motion
- ❖ Defects
- ❖ Over Processing
- ❖ Waiting



**Rob Profits
and lead to
Environmental
Waste**

Lean Tools & Techniques

❖ Value Stream Map

- Flow of material and information in current state
- Include environmental waste (“fallout”)

❖ Kaizen

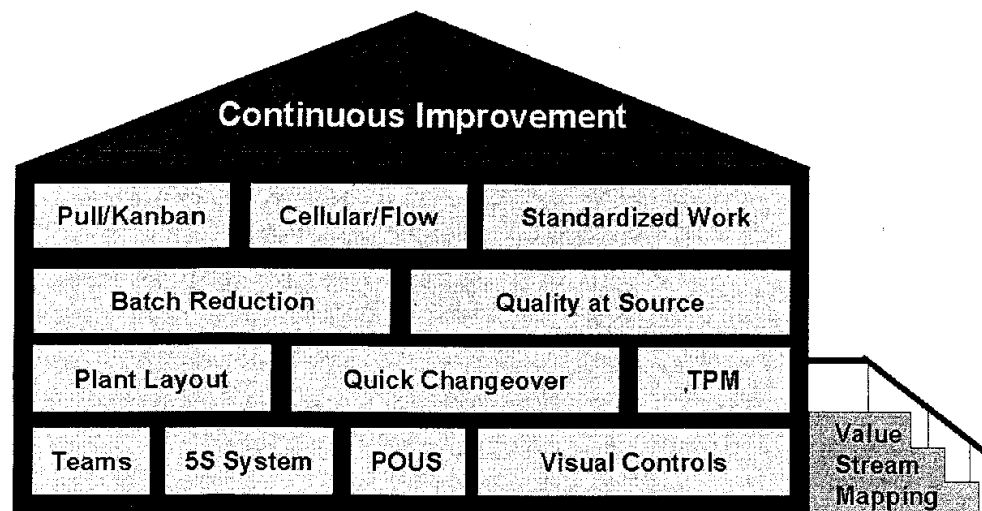
- Rapid improvement event (“get ‘er done”)

❖ 6S (5S + Safety)

- Sort
- Set in Order
- Shine
- Standardize
- Sustain
- Safety

❖ Standard Work

Lean Building Blocks



More Tools & Techniques

❖ Visual Systems

- Pictures and diagrams
- Color coding
- Outlines on floor
- Improved lighting

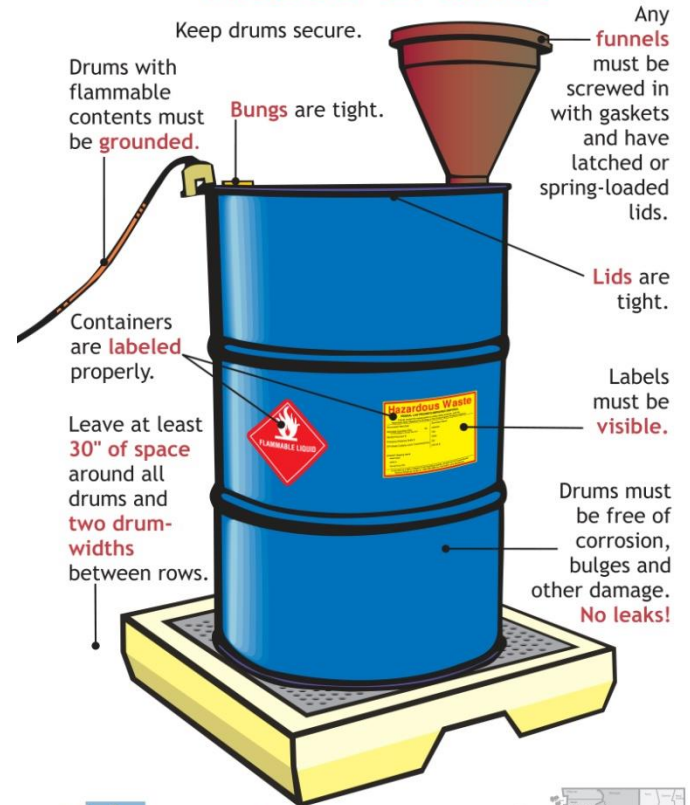
❖ Six Sigma

- Statistical analyses
- Pinpoint quality issues

❖ Kanban (Pull) Systems

- Re-order cards on material
- Trigger based on actual use of material

Inspect your dangerous waste drums



**Dangerous Waste:
Do It Right!**

Questions? Please call your regional dangerous waste specialist at the Department of Ecology.



Reference Chapter 173-303-2001-430, Use and management of containers. Thanks to Idaho Department of Environmental Quality for original poster concept. Ecology publication #08-04-015

Lean Manufacturing – Results



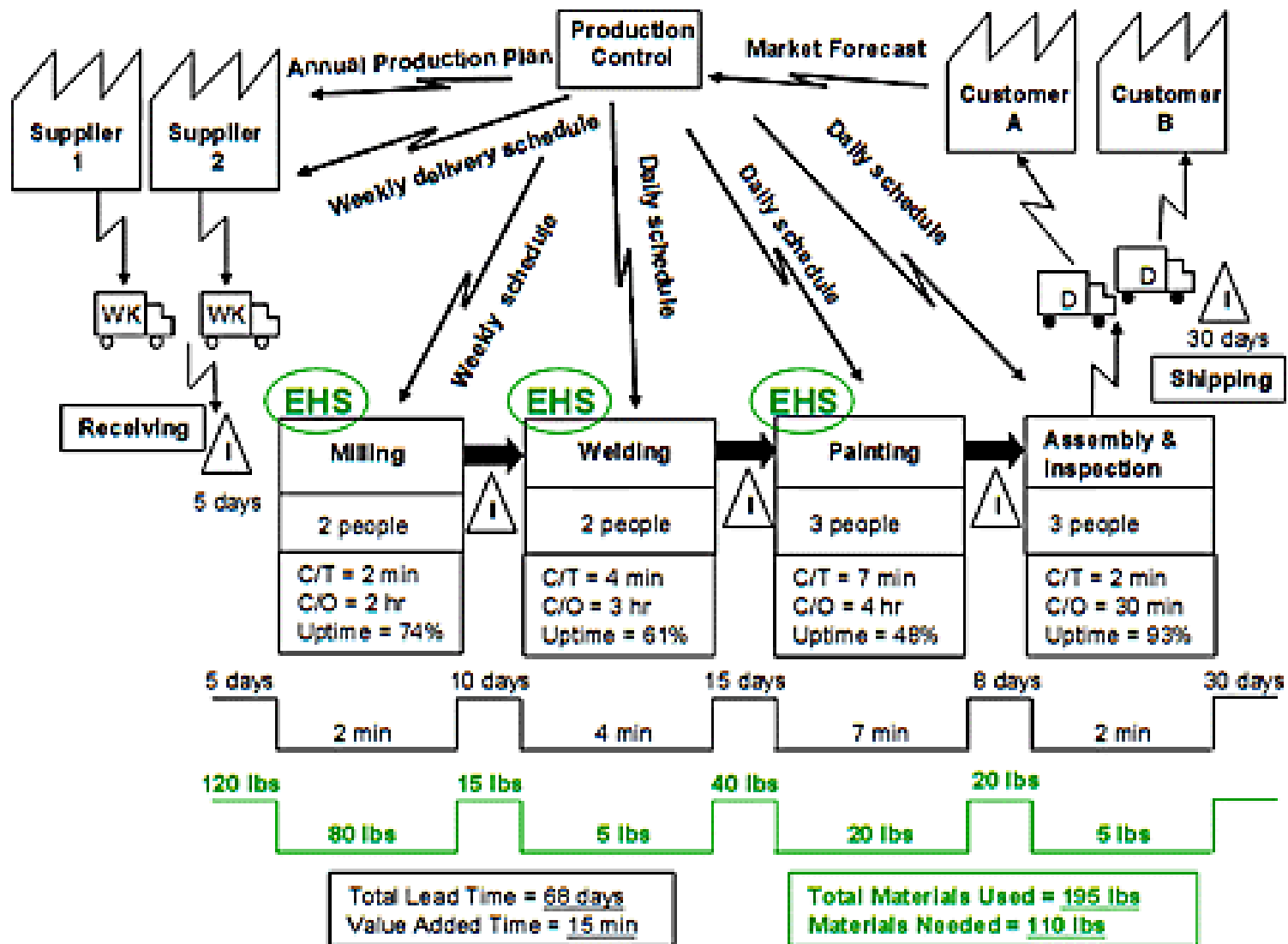
❖ Lean can lead to*:

- 90% Reduction of Production Times
- 50% Increase in Productivity
- 80% Quality Improvement
- 75% Improvement in Space Utilization
- 85% Reduction of Work in Progress

*Data source – Lean 101 Training

Washington Manufacturing Services

Example of a Value Stream Map



Shows work flow, process time, wait time, materials used and materials wasted

Examples of 5S



Use a “shadow” board for tools. Workers can easily find the tool they need and can tell right away what’s missing

Use a moveable supply cart to eliminate walking back and forth for items. Refill in storage area and bring all materials to work area in one trip.

5S Example



Storage area before applying the 5S technique.

5S Example



Same area after applying the 5S technique. “New” storage space. Less time looking for gear and more time to do the job. No more duplicate purchases because items couldn’t be found.

Helpful Resources – Ecology's Lean and Environment Projects

www.ecy.wa.gov/programs/hwtr/lean/grant.html

- ❖ Partnership between Ecology and Washington Manufacturing Services (WMS).
 - Projects integrate lean manufacturing and environmental methods for Washington manufacturers.
 - Improves productivity, increases process efficiency, reduces waste, and increases competitiveness.
 - Partial funding – clients must also invest in project.
- ❖ Contact:
 - Hugh O'Neill, Ecology
 - (360) 584-2479, hone461@ecy.wa.gov
 - Nigel Moore, WMS
 - (425) 438-1146 x104, nmoore@wamfg.org

Helpful Resources – Ecology's TREE Team

www.ecy.wa.gov/tree/index.html

Technical Resources for Engineering Efficiency (TREE)

- ❖ Expertise in reducing energy and water use, and generation of wastewater and hazardous and solid waste.
- ❖ Free, confidential, non-regulatory
- ❖ Contact:
 - Scott Mallery
(509) 329-3473, smal461@ecy.wa.gov
 - Lynn Coleman
(360) 407-6352, lcol461@ecy.wa.gov

Helpful Resources – P2 Websites

- ❖ Washington Department of Ecology
www.ecy.wa.gov/programs/hwtr/reducewaste.html
- ❖ Oregon Department of Environmental Quality
www.deq.state.or.us/programs/sustainability/10ways-businesses.htm
- ❖ Pollution Prevention Resource Center
www.pprc.org
- ❖ Waste Reduction Resource Center
wrrc.p2pays.org
- ❖ Environmental Protection Agency
www.epa.gov/p2/



Publicity, Recognition and Customer Approval



❖ EnviroStars

- Recognizes small quantity generators that reduce hazardous materials and wastes, and implement environmentally beneficial practices.
- Awarded by Jefferson, King, Kitsap, Pierce, and Whatcom counties

www.envirostars.org